

# Notice of Allowability

Application No.

10/039,635

Examiner

Phillip A. Johnston

Applicant(s)

BLACK ET AL.

Art Unit

2881

## -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to proposed amendment of 5-23-2007.
2. ☒ The allowed claim(s) is/are 1-18, 20-29, 31, 32 and 37-42.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All b) ☐ Some\* c) ☐ None of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

### Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413),  
Paper No./Mail Date 5-24-2007
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

  
**Jack I. Berman**  
Primary Examiner

***Detailed Action***

1. This action is in response to a proposed amendment submitted to the examiner on 5-23-2007, wherein claims 1,10,24-28,37-38, and 42 were amended. Claims 1-18,20-29,31,32, and 37-42 are pending.

***Examiners Amendment***

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mohammad Rahman on 5-23-2007. Additions to the claims made below are underlined, and deletions are bracketed [ - ].

The Claims are amended as follows;

-- 1. (Currently Amended) A scanning probe microscope tip consisting of coating said tip with a layer of chemically-synthesized nanoparticles affixed to said tip such that a drop of solvent containing said nanoparticles is deposited onto a surface of a liquid subphase prior to said nanoparticles being affixed to said tip, each of said nanoparticles comprising a length and width, wherein said length differs from said width by less than approximately 15%,

wherein said each of said nanoparticles comprises an outer coating layer encapsulating each nanoparticle,

wherein said tip is a non-magnetic silicon AFM tip,

wherein said tip is coated with an adhesion layer,

wherein said adhesion layer is between said tip and said nanoparticles,

[and]

wherein said nanoparticles are generally spherical[[.]], and

wherein said solvent comprises any of toluene, heptane, pentane, chloroform, and dichloromethane. --

-- 10.(Currently Amended) A method of forming a scanning probe microscope tip, said method consisting of:

depositing a solvent containing nanoparticles onto a surface of a liquid solution,  
wherein said solvent comprises any of toluene, heptane, pentane, chloroform,  
and dichloromethane;

wherein the tip is a non-magnetic silicon AFM tip;

[coating] wherein said scanning probe microscope tip is coated with an adhesion promoter;

[dipping] wherein said scanning probe microscope tip is first dipped into [[a]] the liquid solution of nanoparticles and then said scanning probe microscope tip is withdrawn from said liquid solution, each of said nanoparticles comprising a length and a width; and

[withdrawing said scanning probe microscope tip from said solution;]

wherein said length differs from said width by less than approximately 15%,

wherein [said step of] the dipping causes said nanoparticles to become affixed to said scanning probe microscope tip,

wherein said scanning probe microscope tip comprises a tip apex,

wherein said each of said nanoparticles comprises an outer coating layer, and

wherein said nanoparticles are generally spherical. --

-- 24. (Currently Amended) A method of forming a scanning probe microscope tip, said method consisting of:

depositing a solvent containing generally spherical nanoparticles onto a surface of a liquid solution, wherein said solvent comprises any of toluene, heptane, pentane, chloroform, and dichloromethane;

wherein said tip is a non-magnetic silicon AFM tip;

coating said scanning probe microscope tip, with the exception of an apex of said tip, with a sacrificial adhesion layer;

affixing the nanoparticles to said tip, wherein said affixing consists of depositing said generally spherical nanoparticles from said liquid solution over said tip, ~~wherein said nanoparticles are affixed to said tip,~~ each of said nanoparticles comprising a length and width, said length differs from said width by less than approximately 15%; and

removing said sacrificial layer,  
wherein said each of said nanoparticles comprises an outer coating layer  
encapsulating each nanoparticle. --

-- 25. (Currently Amended) A method of forming a scanning probe microscope  
tip, said method consisting of:

depositing a solvent containing generally spherical nanoparticles onto a  
surface of a liquid subphase, wherein said solvent comprises any of toluene,  
heptane, pentane, chloroform, and dichloromethane;

wherein said tip comprises a non-magnetic silicon AFM tip;  
coating said scanning probe microscope tip with an adhesion promoter;

affixing the nanoparticles to said tip, wherein said affixing consists of  
dipping said scanning probe microscope tip into a monolayer of said generally  
spherical nanoparticles floating on [[a]] said liquid subphase, each of said  
nanoparticles comprising a length and width, said length differs from said width  
by less than approximately 15%; and

withdrawing said scanning probe microscope tip from said liquid  
subphase;

~~[wherein said step of dipping causes said nanoparticles to affix to said scanning  
probe microscope tip,]~~

wherein said scanning probe microscope tip comprises a tip apex, and

wherein said each of said nanoparticles comprises an outer coating layer encapsulating each nanoparticle. --

-- 26. (Currently Amended) A method of forming a scanning probe microscope tip, said method consisting of:

depositing a solvent containing generally spherical nanoparticles onto a surface of a liquid subphase, wherein said solvent comprises any of toluene, heptane, pentane, chloroform, and dichloromethane;

wherein said tip is a non-magnetic silicon AFM tip;

inking an elastomer with a plurality of said generally spherical nanoparticles, each of said nanoparticles comprising a length and width, said length differs from said width by less than approximately 15%;

coating said scanning probe microscope tip with an adhesion promoter;

affixing the nanoparticles to said tip, wherein said affixing consists of

dipping said scanning probe microscope tip into said elastomer; and

withdrawing said scanning probe microscope tip from said elastomer;

~~{wherein said step of dipping causes said nanoparticles to affix to said scanning probe microscope tip;}~~

wherein said scanning probe microscope tip comprises a tip apex, and

wherein said each of said nanoparticles comprises an outer coating layer encapsulating each nanoparticle. --

-- 27. (Currently Amended) A method of forming a scanning probe microscope tip, said method consisting of:

depositing a solvent containing generally spherical nanoparticles onto a surface of a liquid solution, wherein said solvent comprises any of toluene, heptane, pentane, chloroform, and dichloromethane;

wherein said tip is a non-magnetic silicon AFM tip;

coating said scanning probe microscope tip with an adhesion promoter;

affixing the nanoparticles to said tip, wherein said affixing consists of dipping said scanning probe microscope tip into [[a]] said liquid solution, wherein said liquid solution is nonvolatile and further comprises a plurality of said generally spherical nanoparticles dispersed therein, each of said nanoparticles comprising a length and width, said length differs from said width by less than approximately 15%;

withdrawing said scanning probe microscope tip from said liquid solution;  
and

washing off said liquid solution, whereby said nanoparticles remain on said scanning probe microscope tip,

~~{wherein said step of dipping causes said nanoparticles to affix to said scanning probe microscope tip, }~~

wherein said scanning probe microscope tip comprises a tip apex, and

wherein said each of said nanoparticles comprises an outer coating layer encapsulating each nanoparticle. --

-- 28. (Currently Amended) A method of forming a scanning probe microscope tip, said method consisting of:

depositing a solvent containing generally spherical nanoparticles onto a surface of an electrochemical liquid solution, wherein said solvent comprises any of, toluene, heptane, pentane, chloroform, and dichloromethane;

wherein said tip is a non-magnetic silicon AFM tip;

coating said scanning probe microscope tip with an adhesion promoter;

affixing the nanoparticles to said tip, wherein said affixing consists of

dipping said scanning probe microscope tip into ~~[an]~~ the electrochemical solution, wherein said electrochemical solution comprises ~~[generally spherical nanoparticles, a solvent, and]~~ an electrode held at a neutral potential, each of said nanoparticles comprising a length and width, said length differs from said width by less than approximately 15%;

applying an electric potential to said scanning probe microscope tip; and

withdrawing said scanning probe microscope tip from said electrochemical solution;

~~[wherein said step of dipping causes said nanoparticles to affix to said scanning probe microscope tip,]~~

wherein said scanning probe microscope tip comprises a tip apex, and

wherein said each of said nanoparticles comprises an outer coating layer encapsulating each nanoparticle. --



-- 37. (Currently Amended) A scanning probe microscope tip consisting of;  
coating said tip with a layer of chemically-synthesized generally spherical  
nanoparticles affixed to said tip such that a drop of solvent containing said  
nanoparticles is deposited onto a surface of a liquid subphase prior to said  
nanoparticles being affixed to said tip,

wherein said solvent comprises any of toluene, heptane, pentane,  
chloroform, and dichloromethane,

wherein said tip comprises a non-magnetic silicon AFM tip;

wherein said nanoparticles are shaped in a configuration other than an  
elongated tube configuration,

wherein each of said nanoparticles comprises an outer coating layer  
encapsulating each nanoparticle,

wherein said scanning probe microscope tip is coated with an adhesion  
layer, and,

wherein said adhesion layer is between said tip and said nanoparticles. --

-- 38. (Currently Amended) A scanning probe microscope tip consisting of;  
coating said tip with a layer of chemically-synthesized nanoparticles affixed to  
said tip such that a drop of solvent containing said nanoparticles is deposited  
onto a surface of a liquid subphase prior to said nanoparticles being affixed to  
said tip, each of said nanoparticles comprising a length and width, wherein said  
length differs from said width by less than approximately 15%,

wherein said tip is a non-magnetic silicon AFM tip;

wherein said each of said nanoparticles comprises an outer coating layer encapsulating each nanoparticle,

wherein said outer coating layer comprises an organic layer,

wherein said nanoparticles having a diameter ranging from 2 nm to 20 nm, and said organic layer having a thickness ranging from 0.5 nm to 5 nm,

wherein said outer coating layer comprises an organic coat comprising a head-group and a tail-group;

wherein said head group comprises one of an amine, carboxylic acid, isocyanide, nitrile, phosphene, phosphonic acid, sulfonic acid, thiol, and trichlorosilane;

wherein said tail-group comprises one of an alkyl chain, aryl chain, fluorocarbon, siloxane, fluorophore, DNA, carbohydrate, and protein,

wherein said tip is coated with an adhesion layer,

wherein said adhesion layer is between said tip and said nanoparticles,

wherein said nanoparticles are generally spherical,

wherein said adhesion layer comprises one of n-(2-aminoethyl) 3-aminopropyl-trimethoxysilane, polyethyleneimine, polymethylmethacrylate, epoxy, cyanoacrylate adhesive, and an  $\alpha,\omega$  alkyl chain,

wherein said layer of chemically-synthesized nanoparticles is a single layer of nanoparticles thick and covers only the apex of said tip, and

wherein said layer of chemically-synthesized nanoparticles is at least one

nanoparticle thick[.], and

wherein said solvent comprises any of toluene, heptane, pentane, chloroform, and dichloromethane. --

- 42. (Currently Amended) A scanning probe microscope tip consisting of:  
coating said tip with a layer of chemically-synthesized generally spherical nanoparticles affixed to said tip such that a drop of solvent containing said nanoparticles is deposited onto a surface of a liquid subphase prior to said nanoparticles being affixed to said tip, each of said nanoparticles comprising a length and width, wherein said length differs from said width by less than approximately 15%,  
wherein said tip is a non-magnetic silicon AFM tip;  
wherein said each of said nanoparticles comprises an outer coating layer encapsulating each nanoparticle,  
wherein said tip is coated with an adhesion layer,  
wherein said adhesion layer is between said tip and said nanoparticles,  
wherein said adhesion layer comprises one of n-(2-aminoethyl) 3-aminopropyl-trimethoxysilane, polyethyleneimine, polymethylmethacrylate, epoxy, cyanoacrylate adhesive, and an  $\alpha,\omega$  alkyl chain, and  
wherein said layer of chemically-synthesized nanoparticles is at least one nanoparticle thick[.], and

wherein said solvent comprises any of toluene, heptane, pentane, chloroform, and dichloromethane. --

***Allowable Subject Matter***

3. Claims 1-18,20-29,31,32, and 37-42 are allowed

***Examiner's statement of reasons for allowance***

The following is an examiner's statement of reasons for allowance:

4. Claims 1,10,24-28,37-38, and 42 all incorporate the transitional phrase "consists of" in the preamble and therefore claims 1,10,24-28,37-38, and 42 include only those elements, steps, or ingredients specified therein. Claims 1,10,24-28,37-38, and 42 are allowed because prior art fails to show a non-magnetic silicon scanning probe microscope tip, having a coating of spherical nanoparticles applied to the tip by dipping the tip into a liquid, after a drop of solvent containing nanoparticles was previously deposited onto the surface of the liquid, and after an adhesive layer was previously applied to the silicon tip.

5. Claims 2-9,11-18,20-23,29,31,32, and 39-41 are allowed by virtue of their dependency upon allowed claims 1,10,24-28,37-38, and 42. In addition, by virtue of their dependency on claims 1,10,24-28,37-38, and 42, which incorporate the

transitional phrase "consists of", no elements or steps may be added to the elements or steps recited in claims 2-9,11-18,20-23,29,31,32, and 39-41.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Conclusion***

6. Any inquiry concerning this communication or earlier communications should be directed to Phillip Johnston whose telephone number is (571) 272-2475. The examiner can normally be reached on Monday-Friday from 7:30 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiners supervisor Robert Kim can be reached at (571) 272-2293. The fax phone number for the organization where the application or proceeding is assigned is 571 273 8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PJ  
May 23, 2007

  
Jack I. Berman  
Primary Examiner